Global Geodetic Reference System

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Outline

- Impact of GNSS Positioning
- Global Reference Frames
- Why a Global Approach is Needed
- Conclusion and Actions

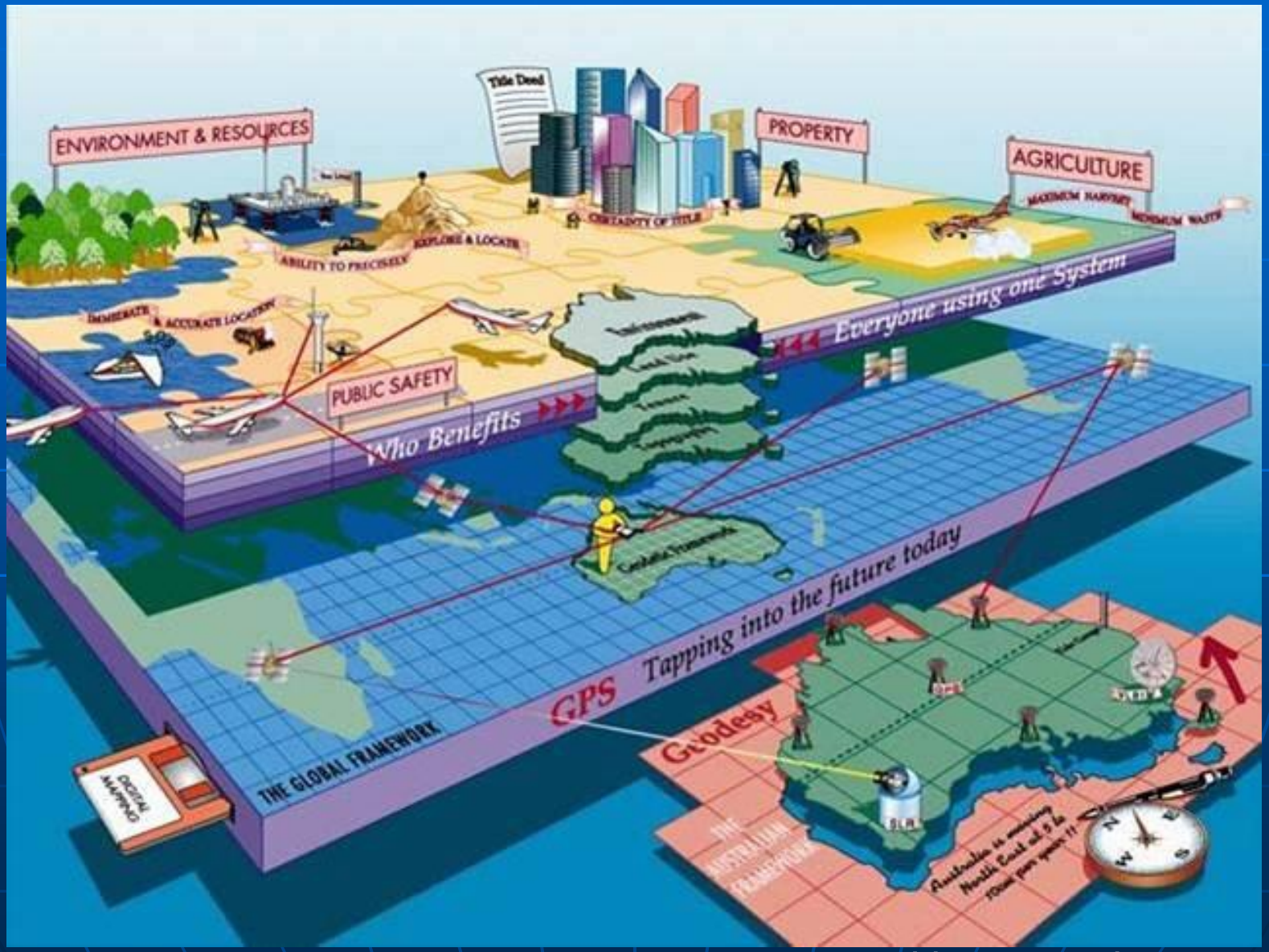
GNSS Positioning

- Precise positioning and timing
  - Navigation (sea and air, include military use)
  - Surveying and mapping
  - Engineering – road, rail, civil
  - Agriculture and environmental monitoring
  - Recreation
  - Tracking and location-based services
  - Timing (financial transactions, electrical power grids, cellular networks)
  - Emergency response
  - Scientific research

GNSS Positioning

- Positioning for everybody
  - Smart phone and tablet applications
  - Car navigation and Intelligent transportation
  - GPS digital cameras
  - …
  - New applications appear every day

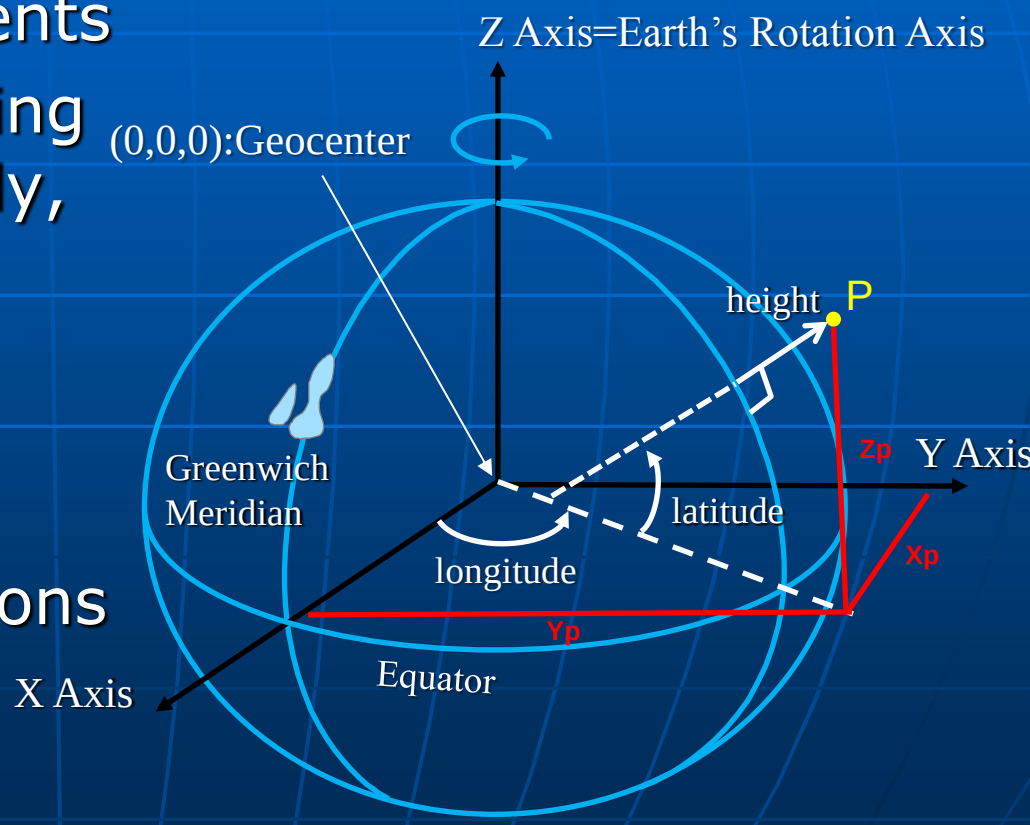
Fundamental Infrastructure: Geodetic Reference Frame



Prepared by Geoscience Australia

Global Geodetic Reference Frames

- Cornerstone of all geospatial measurements
- Evolving with positioning technologies, especially, space geodetic techniques
- Wide range of applications via GNSS
- Support GNSS operations



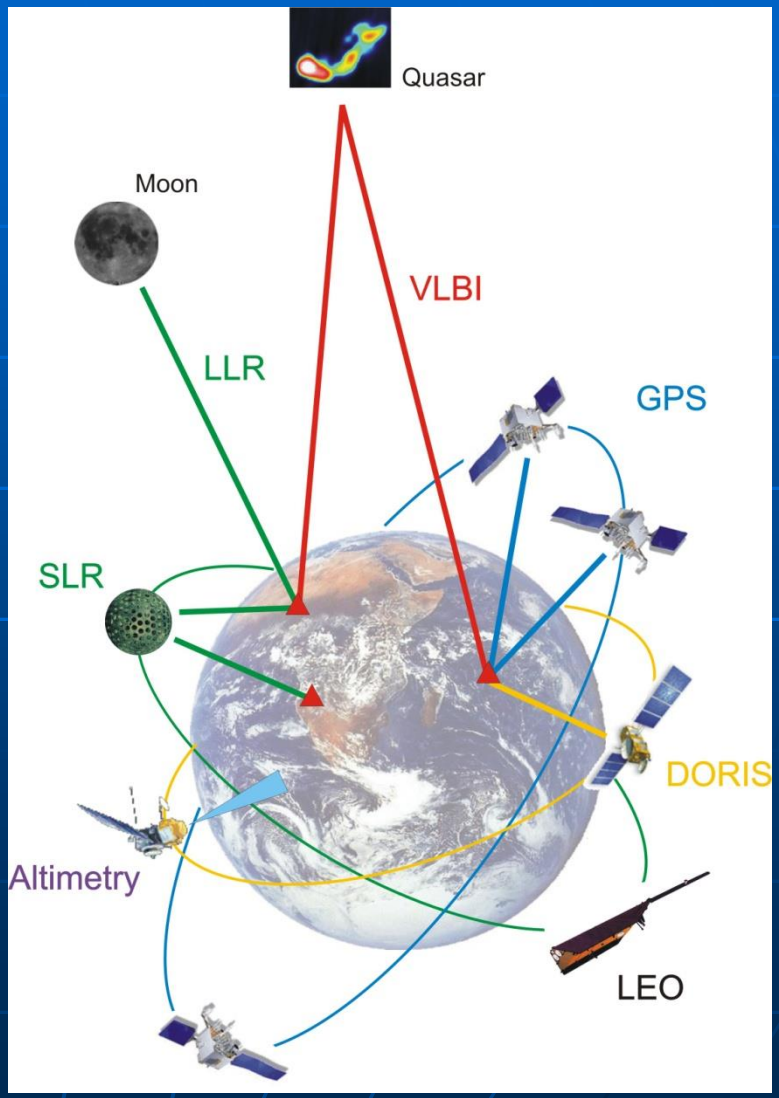
National and Regional Frames need to refer to the Global Frame

- National Frame
  - Authoritative source of station coordinates in a nation
  - Land, utility and asset management
  - Emergency and disaster management
- Regional Frame
  - Link between national datum and global standard (ITRF), overcoming differences in geodetic ability of each nation
  - Realized by sharing data and analysis
- Without high quality connection to a global geocentric frame, full benefit of GNSS and its applications cannot be obtained

Realization of Global Geodetic Reference Frames by Space Geodetic techniques

- VLBI
- GNSS (GPS and others)
- SLR, LLR
- DORIS
- …

- WGS84 ver.x.x.:GPS (U.S)
- ITRFxx: combination of techniques (IERS), since 1989, present standard of scientific community



Why is a Global Approach Needed?

- A consistent global approach to positioning is a key enabler of spatial data interoperability
- Positioning is a global capability that can only be delivered through the use of global geodetic networks together with open availability of the collected data
- Global and regional issues, such as sustainable development, climate change and regional hazard assessment, are best addressed using consistent technology and approaches to positioning and spatial data management

BUT…

- No international consensus on who should take the lead in adopting the geodetic reference system
- Many countries have not yet adopted a global reference system

Considerations for Governments

- GNSS changed the paradigm of geodetic positioning. Today, "Positioning by GNSS" sees its applications in virtually every aspect of geospatial, and hence, societal activities
- The accuracy and stability of GNSS relies on a global geodetic reference system, which requires substantive support for maintenance
- Governments should take the responsibility for providing a common global frame to facilitate geospatial activities, and to obtain full benefit from a modern positioning system
- Governments also need to consider the maintenance of the global geodetic infrastructure through which the global reference frame is realized

What can UN-GGIM do? (1)

1. UN-GGIM (Secretariat) writes a letter of questionnaire to all member states in early September to inquire the following and request a reply by the end of October, while emphasizing the role of the government in adopting and maintaining a globally connected common geodetic reference system:
   a. The organization (government authority) which is responsible for the maintenance of geodetic datum.
   b. The details of the current geodetic datum.
2. Secretariat organizes an informal consultation of UN-GGIM to discuss outstanding technical issues on global geodetic reference system on 2 November in Bangkok in conjunction with the 19th UNRCC-AP, inviting expert organizations including the Global Geodetic Observing System (GGOS).

What can UN-GGIM do? (2)

3. Each of the regional bodies (PCGIAP and others) analyses the results of the questionnaire and develops a road map or strategy on how the situation should be improved in the region.
4. Secretariat organize a special session on global geodetic reference system during the 2nd HLF on UN-GGIM in Qatar, inviting major donor agencies, and requests each regional body to report on their road map and share it with the other regional bodies for the revision.
5. Secretariat organize a session on the same topic during the 3rd UN-GGIM and requests each regional body to present the progress on the road map.
6. Secretariat continues to review the progress at subsequent UN-GGIM meetings and forums.

Thank you for your attention